

CLAIMS

1. (Amended) An optical head for recording a signal in an optical recording medium or reproducing a signal recorded in the optical recording medium,
5 the optical head comprising:
 a light source;
 an objective lens for focusing light emitted from the light source on the optical recording medium;
 a tilt-related-aberration correcting means for correcting an
10 aberration that occurs when the optical recording medium tilts; and
 a driving amount determining means for determining a driving amount necessary for the tilt-related-aberration correcting means,
 wherein the tilt-related-aberration correcting means is provided with the driving amount determined by the driving amount determining
15 means according to information concerning a tilt of the optical recording medium and information concerning a substrate thickness of the optical recording medium.
2. The optical head according to claim 1,
20 wherein the tilt-related-aberration correcting means is a means for tilting the objective lens.
3. The optical head according to claim 2,
 wherein
25 the objective lens has a certain set numerical aperture (NA), and
 a tilted amount of the objective lens is varied according to the substrate thickness of the optical recording medium.
4. The optical head according to claim 1,
30 wherein the objective lens has a NA of not less than 0.7.
5. (Amended) The optical head according to claim 1,
 wherein the driving amount determining means is a memory in which information concerning the driving amount for the
35 tilt-related-aberration correcting means that is necessary for correcting an aberration that occurs due to a tilt of the optical recording medium is stored, the driving amount being determined according to the information

concerning the tilt of the optical recording medium and the information concerning the substrate thickness of the optical recording medium.

6. The optical head according to claim 1, further comprising a tilt
5 detecting means for detecting information concerning the tilt of the optical recording medium.

7. The optical head according to claim 6,
wherein the tilt detecting means comprises:
10 a second light source different from said light source;
a focusing lens for focusing light emitted from the second
light source on the optical recording medium; and
a photodetector for detecting light reflected by the optical
recording medium.

15 8. The optical head according to claim 6,
wherein the tilt detecting means detects focus zero-crossing
positions at two certain points in a radial direction of the optical recording
medium, and detects a tilting amount of the optical recording medium based
20 on a difference between values of a focus search voltage at the two points,
the focus search voltage being a voltage for detecting the focus zero-crossing
position.

9. The optical head according to claim 1, further comprising a memory
25 in which information concerning the substrate thickness of the optical
recording medium is stored.

10. The optical head according to claim 1, further comprising a
substrate thickness detecting means for detecting information concerning
30 the substrate thickness of the optical recording medium.

11. The optical head according to claim 10,
wherein the substrate thickness detecting means comprises:

wherein

the substrate-thickness-related-aberration correcting means is formed with an optical element, the optical element comprising a pair of substrates having transparent conductive thin films, respectively, and a phase shifting layer interposed between the pair of substrates, and

a pattern capable of correcting an aberration that occurs relating to the substrate thickness of the optical recording medium is formed on one of the conductive thin films.

17. The optical head according to claim 14, wherein

the tilt-related-aberration correcting means and the substrate-thickness-related-aberration correcting means are formed with one optical element, the optical element comprising a pair of substrates having transparent conductive thin films, respectively, and a phase shifting layer interposed between the pair of substrates, and

a pattern capable of correcting an aberration that occurs relating to the substrate thickness of the optical recording medium is formed on one of the conductive thin films, and

a pattern capable of correcting an aberration that occurs due to the tilt of the optical recording medium is formed on the other conductive thin film.

18. The optical head according to any one of claims 13, 16, and 17, wherein the phase shifting layer is made of liquid crystal.

19. (Amended) An aberration correcting method for correcting an aberration that occurs when an optical recording medium tilts, by using an optical head for recording a signal in the optical recording medium or reproducing a signal recorded in the optical recording medium, the optical head comprising:

a light source;

an objective lens for focusing light emitted from the light source on the optical recording medium;

a tilt-related-aberration correcting means for correcting an aberration that occurs when the optical recording medium tilts, and

a driving amount determining means for determining
a driving amount necessary for the tilt-related-aberration
correcting means,

the method comprising the step of providing the tilt-related-aberration
5 correcting means with the driving amount determined by the driving
amount determining means according to information concerning a tilt of the
optical recording medium and information concerning a substrate thickness
of the optical recording medium.

10 20. An optical recording/reproducing device comprising an optical head
for recording a signal in an optical recording medium or reproducing a
signal recorded in the optical recording medium,

wherein the optical head is the optical head according to any one of
claims 1 to 18.

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